Suisun Marsh Monitoring Program
Channel Water Salinity Report

Reporting Period: December 2013

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1. SUISUN MARSH MONITORING STATIONS AND REPORTING REQUIREMENT

As per the State Water Resources Control Board (SWRCB) Water Rights Decision 1641, dated December 29, 1999, and previous SWRCB decisions, the California Department of Water Resources (DWR) is required to provide monthly channel water salinity compliance reports for the Suisun Marsh to the SWRCB. Conditions of channel water salinity in the Suisun Marsh are determined by monitoring specific electrical conductivity, which is referred as "specific conductance" (SC). The locations of all listed stations are shown in Figure 5.

The monthly reports are submitted for October through May each year in accordance with SWRCB requirements. The reports are required to include salinity data from the stations listed below to ensure salinity standards are met to protect habitat for waterfowl in managed wetlands:

COMPLIANCE STATIONS:		
Station Identification	Station Name	General Location
C-2*	Collinsville	Western Delta
S-64	National Steel	Eastern Suisun Marsh
S-49	Beldon's Landing	North-Central Suisun Marsh
S-42	Volanti	North-Western Suisun Marsh
S-21	Sunrise	North-Western Suisun Marsh

Data from the stations listed below are included in the monthly reports to provide information on salinity conditions in the western Suisun Marsh:

MONITORING STATIONS:		
Station Identification	Station Name	General Location
S-97	Ibis	Western Suisun Marsh
S-35	Morrow Island	South-Western Suisun Marsh

* Throughout the report, the representative data from nearby USBR station is used in lieu of data from station C-2.

Information on Delta outflow, area rainfall, and operation of the Suisun Marsh Salinity Control Gates are also included in the monthly reports to provide information on conditions that may affect channel water salinity in the Marsh.

2. MONITORING RESULTS

2.1 Channel Water Salinity Compliance

During the month of December, salinity conditions at all five compliance stations were in compliance with channel water salinity standards (Table 1). Compliance with standards for the month was determined for each compliance station by comparing the progressive daily mean (PDM) of high tide SC with respective standards. The standard for December was 15.5 mS/cm. The progressive daily mean is the monthly average of both daily high tide SC values. The mathematical equation is shown below:

$$\text{PDM} = \frac{\sum \text{daily average of high tide SC}}{\text{\# days in the month}}$$

2.2 Delta Outflow

Outflow for December 2013 ranged between 4,400 cfs and 7,900 cfs (Figure 3). For the month, outflow began at 5,200 cfs and peaked at 7,900 cfs on December 9th. Outflow then decreased and stayed around 4,800 cfs before ending the month at 5,300 cfs. The monthly Delta outflow is represented by the mean Net Delta Outflow Index (NDOI). The NDOI is the estimated daily average of Delta outflow. Mean NDOI for December 2013 is listed below:

Month	Mean NDOI (cubic feet per second)
December	5,400

2.3 Precipitation

There was one significant precipitation event in December that measured 0.72 inch. The event occurred on December 6th. There was also a recording of 0.02 inch of precipitation on December 2nd. Data was recorded at the Fairfield Water Treatment Plant. December's average precipitation in Fairfield is 5.06 inches. The monthly total precipitation is below:

Month	Total Precipitation (inches)
December	0.74

2.4 Suisun Marsh Salinity Control Gates Operations

Operations and flashboard/boat lock installations at the Suisun Marsh Salinity Control Gates (SMSCG) during December 2013 are summarized below:

Date	Gate Status	Flashboards Status	Boat Lock Status
December 1	3 Open	In	Partially Closed
December 2-31	3 Operational	In	Partially Closed

Due to salinity concerns, the gates were operated between December 2-31.

3. DISCUSSION

3.1 Factors Affecting Channel Water Salinity in the Suisun Marsh

Factors that affect channel water salinity levels in the Suisun Marsh include:

- Delta outflow;
- tidal exchange;
- rainfall and local creek inflow;
- managed wetland operations; and,
- operations of the SMSCG and flashboard configurations.

3.2 Observations and Trends

3.2.1 Conditions During the Reporting Period

For December 2013, PDM salinity levels at compliance stations Collinsville (C-2), National Steel (S-64), Beldon's Landing (S-49), Sunrise Club (S-21) and Volanti (S-42) ended the month between 9.75 mS/cm and 13.34 mS/cm as shown in Figure 1. Salinity levels for December started in the range of 9.73 mS/cm to 16.98 mS/cm and gradually decreased during the month. The lowering of salinity was due to the combination of SMSCG operations and the precipitation event on December 6th.

Salinity levels at monitoring stations Morrow Island (S-35) and Ibis (S-97) are shown in Figure 2. The salinity for S-35 began the month of December at 18.97 mS/cm and ended the month at 18.12 mS/cm. Salinity for S-97 started the month at 16.83 mS/cm and gradually increased to 17.13 mS/cm. SMSCG operations can have an effect on S-35 but only local inflows will affect S-97.

3.2.2 Comparison of Reporting Period Conditions with Previous Years

Monthly mean high tide SC at the compliance and monitoring stations for December 2013 were compared with means for those months during the previous nine years (Figure 4).

December's mean salinity pattern for all compliance and monitoring stations ranked on average third highest in salinity levels for the past 10 years. The pattern came close to matching that of 2004, a below normal year, but at slightly higher salinity. Only 2008 (critical year) and 2009 (dry year) were higher in average salinity values. Both 2008 and 2009 were determined to be deficiency periods as defined by D1641. As expected, the salinity levels gradually increased from east to west.

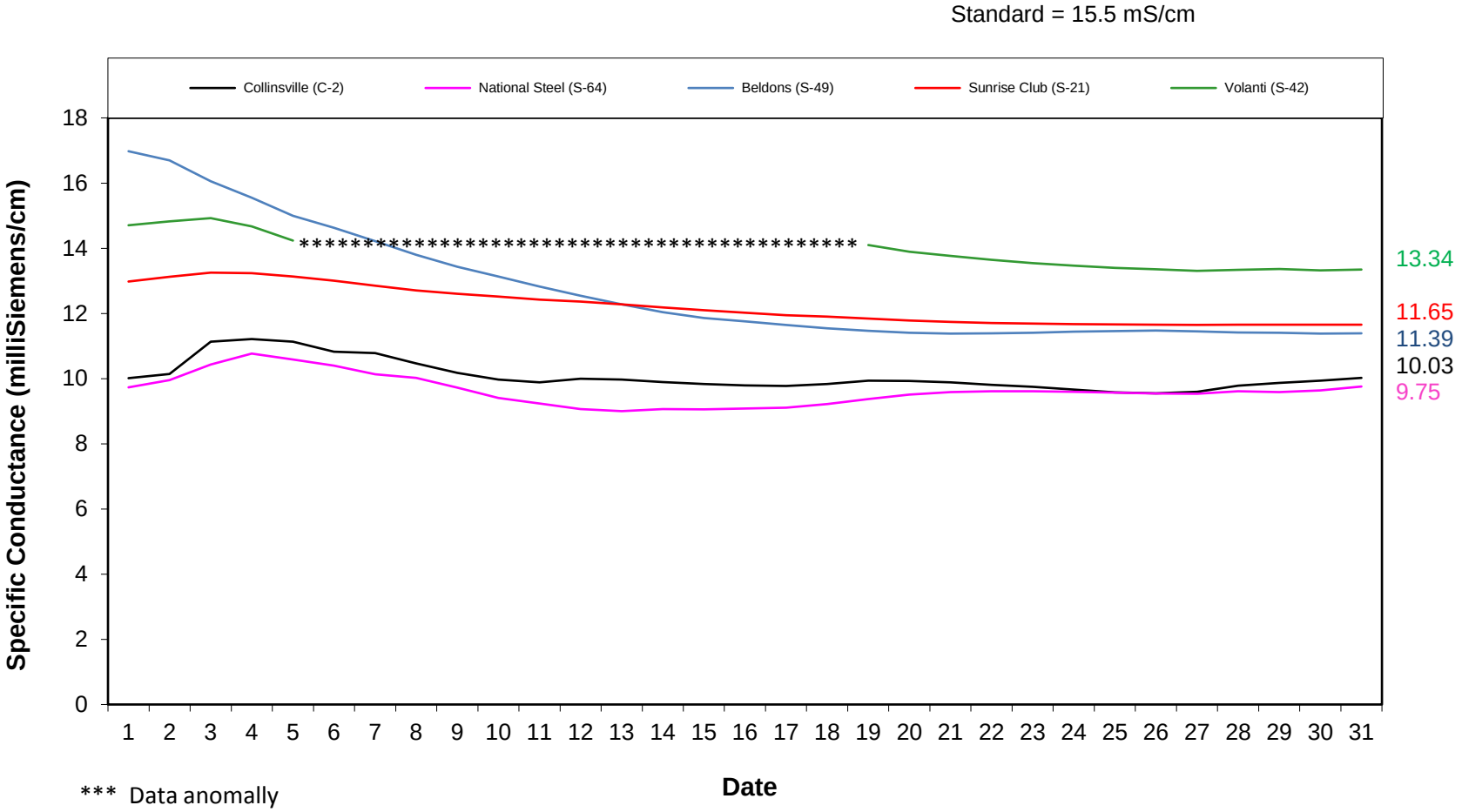
Table 1: Monthly Mean High Tide Specific Conductance at Suisun Marsh Water Quality Compliance Stations December 2013

Station Identification	Specific Conductance (mS/cm)*	Normal Standard	Normal Standard Met?
C-2**	10.03	15.5	Yes
S-64	9.75	15.5	Yes
S-49	11.39	15.5	Yes
S-42	13.34	15.5	Yes
S-21	11.65	15.5	Yes

*milliSiemens per centimeter

**The representative data from nearby USBR station is used in lieu of data from station C-2.

Figure 1: Suisun Marsh Progressive Daily Mean High Tide Specific Conductance for Compliance Stations December 2013



*** Data anomally

Figure 2: Suisun Marsh Progressive Daily Mean High Tide Specific Conductance for Monitoring Stations December 2013

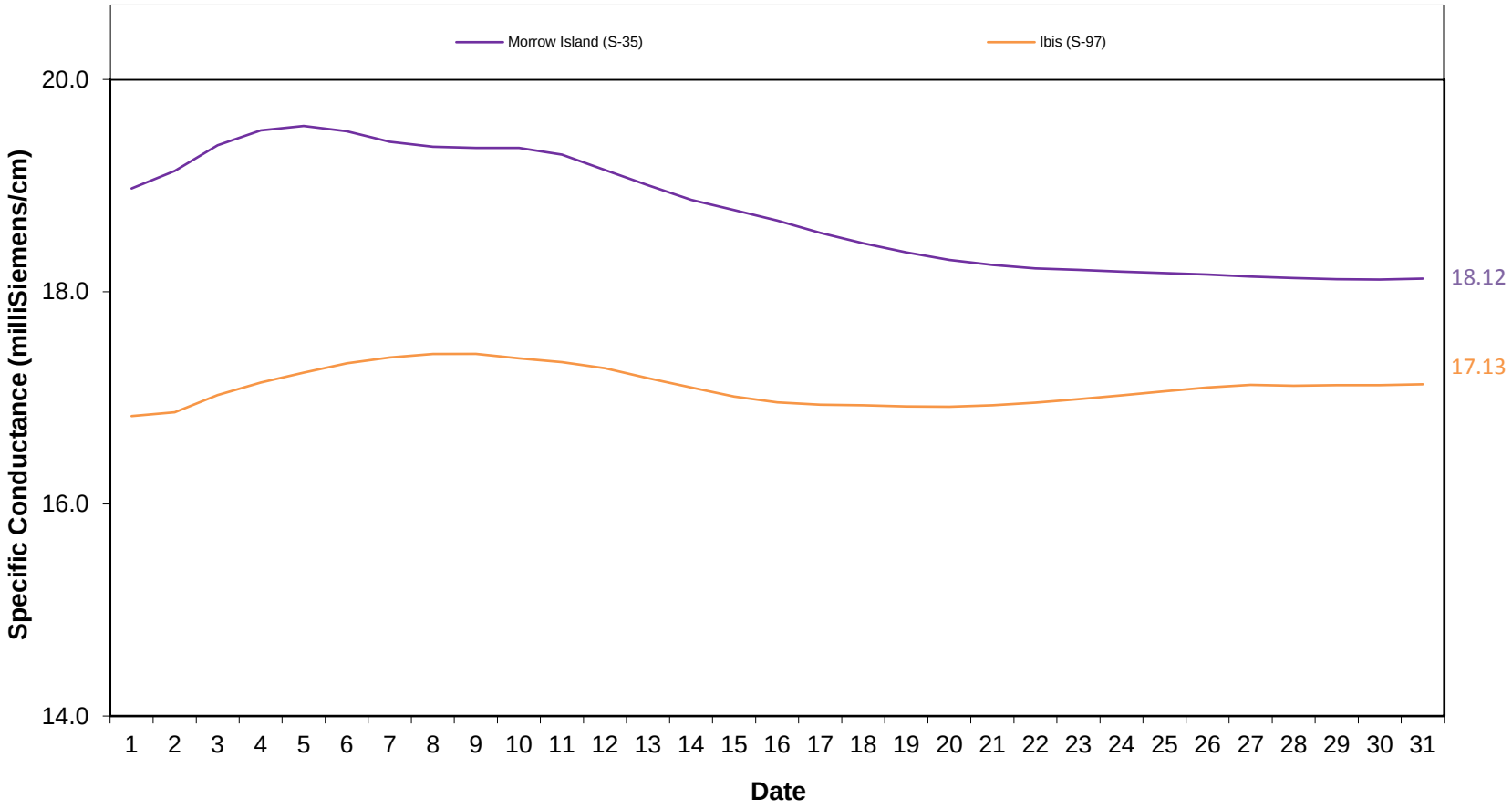


Figure 3: Daily Net Delta Outflow Index and Precipitation
December 2013

*Preliminary DWR, O&M data

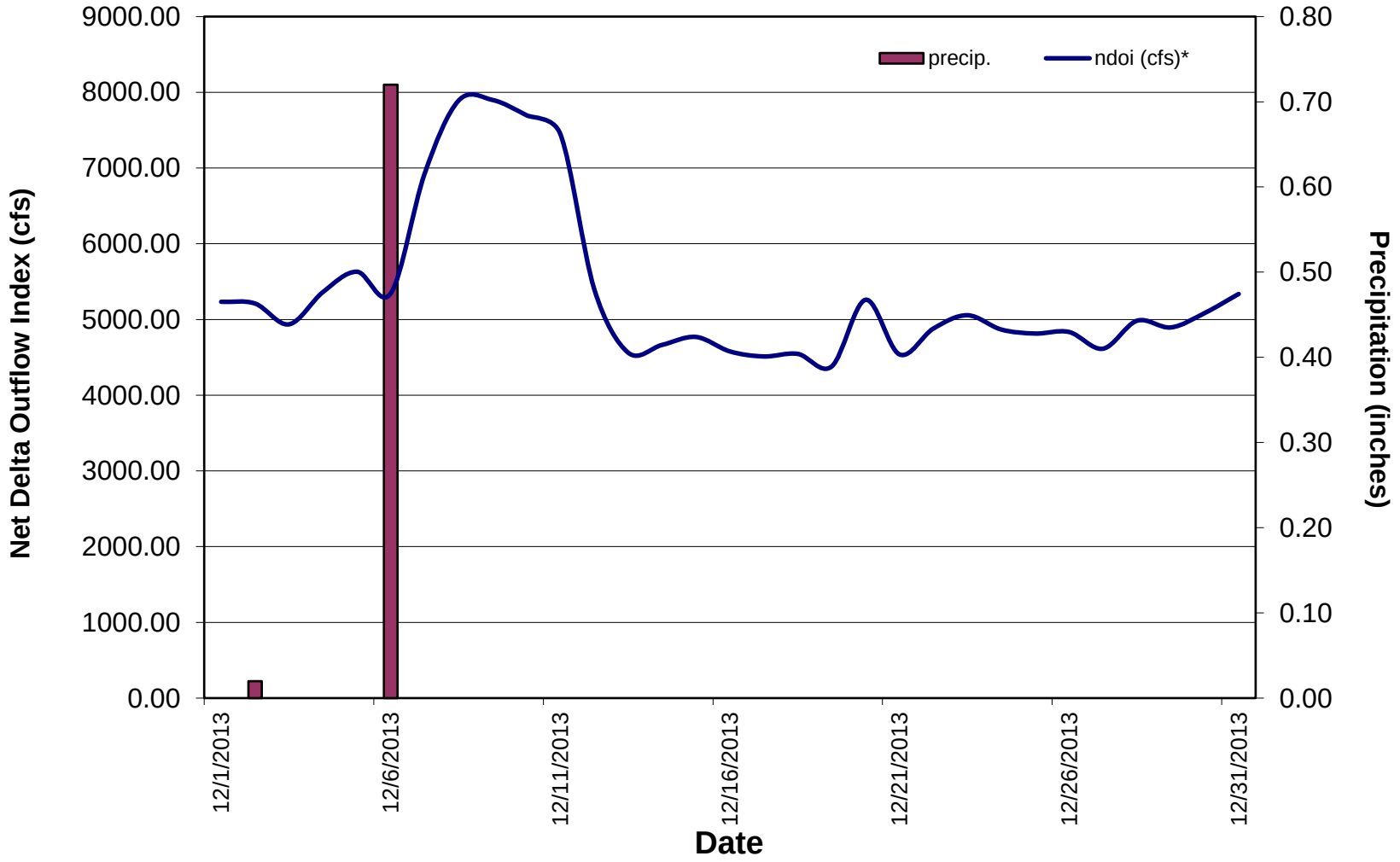
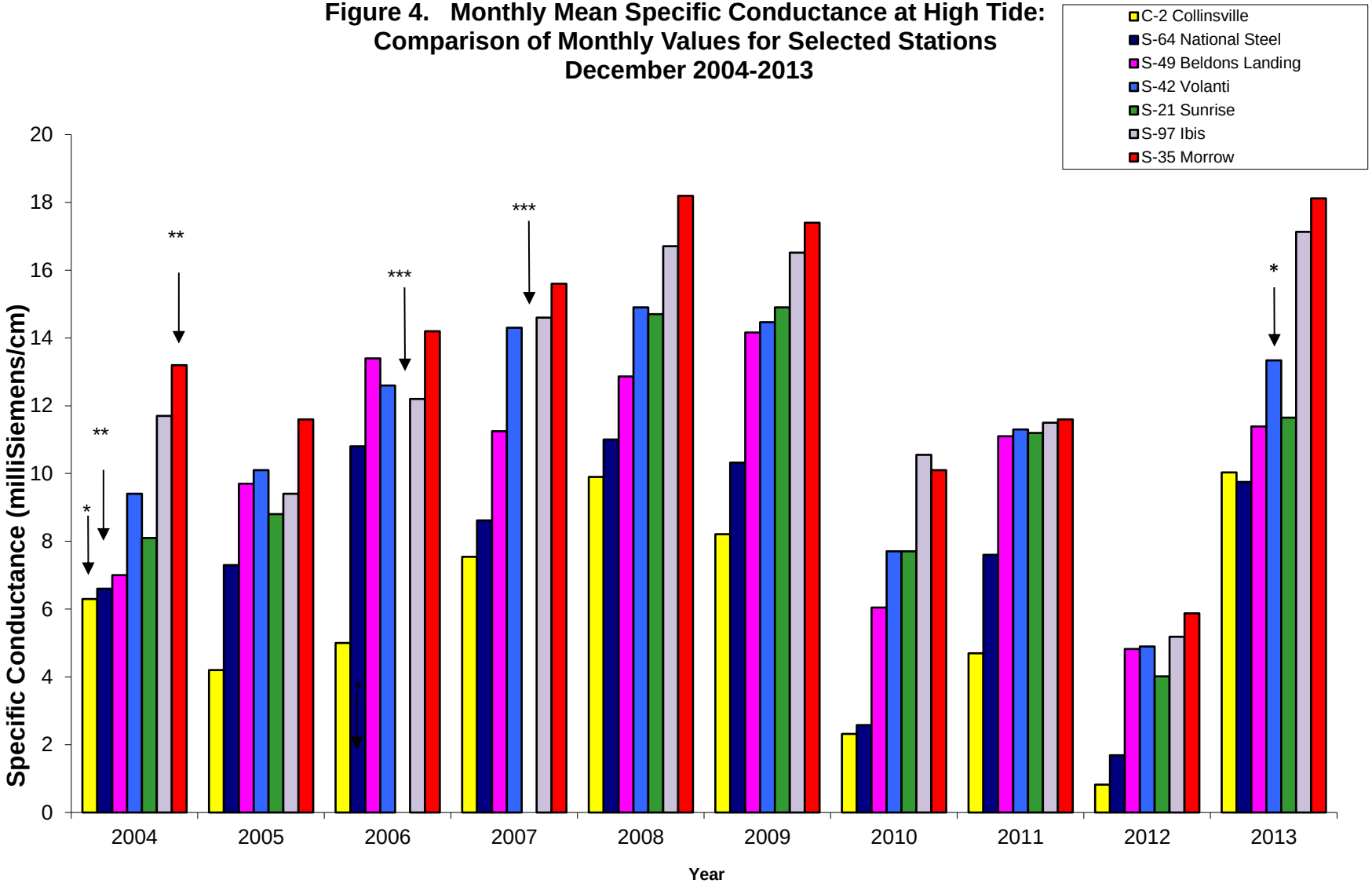


Figure 4. Monthly Mean Specific Conductance at High Tide: Comparison of Monthly Values for Selected Stations December 2004-2013



* Data reflects a partial month. Data collection was interrupted before the end of the month due to equipment failure.
** Data was not obtained due to power problems at the station.
*** Data was not obtained due to equipment failure.

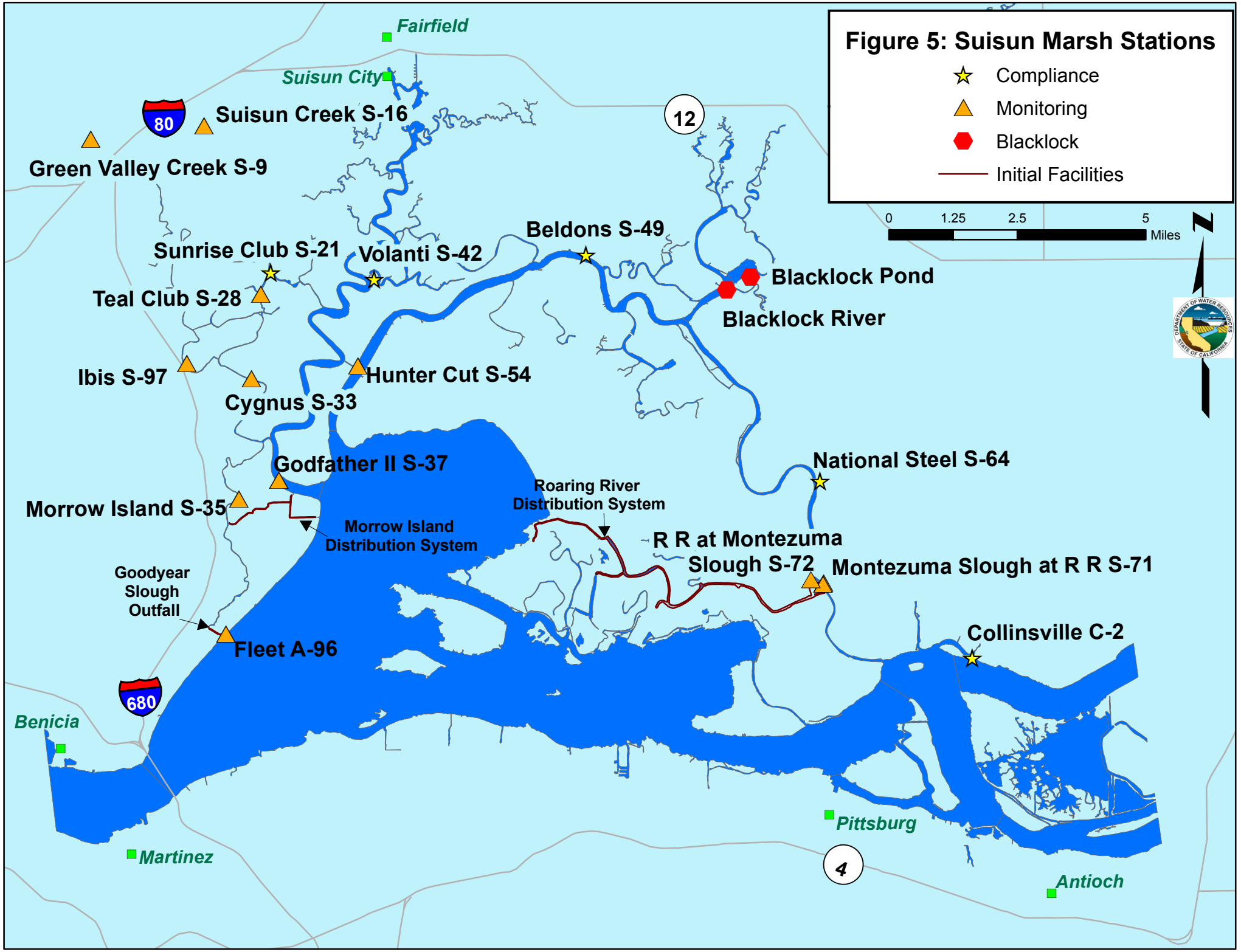


Figure 5: Suisun Marsh Stations
Compliance
Monitoring
Blacklock
Initial Facilities
0
1.25
2.5
5
Miles
Fairfield
Suisun City
Suisun Creek S-16
Green Valley Creek S-9
Sunrise Club S-21
Volanti S-42
Beldons S-49
Blacklock Pond
Blacklock River
Teal Club S-28
Ibis S-97
Hunter Cut S-54
Cygnus S-33
Godfather II S-37
National Steel S-64
Roaring River
Distribution System
Morrow Island S-35
Morrow Island
Distribution System
R R at Montezuma
Slough S-72
Montezuma Slough at R R S-71
Goodyear
Slough
Outfall
Fleet A-96
Collinsville C-2
Benicia
Pittsburg
Martinez
Antioch
80
12
680
4